of mercury, a voluminous yellowish precipitate will take place. If, now, a few drops of fuming nitric acid be mixed with a good deal of water, and this added drop by drop to the fluid under investigation, which is permitted to boil after the addition of each drop, the white precipitate will become dark red. If but little tyrosin is present, the previously milky liquid becomes pale red, and afterwards deposits the dark red flakes, while the supernatant fluid will become colourless.

6. On the application of heat to tyrosin, it gives off the odour of burnt horn; though this can hardly be considered a distinctive test, as leucin and other nitrogenous substances act similarly. Tyrosin does not, however, sublime, as does leucin.

Clinical Significance of the presence of Leucin and Tyrosin.—Although these substances have been found in the solids and fluids of the economy in a number of morbid states, yet, so far as studied, they have only a marked significance when present in the urine in connection with symptoms pointing to derangement of the hepatic function. Under these circumstances they are of grave import, indicating destructive diseases of this organ which have heretofore invariably terminated fatally. As has been already intimated, however, they do not necessarily indicate acute yellow atrophy alone, but may attend any affection of the liver in which there is permanent disorganization of its parenchymatous structure, even if it extend over a period of several months. It does not appear to be present in the urine in cases of liver disease which are perhaps years in completing their course, as in certain instances of cirrhosis, and simple fatty degeneration.

The deficiency of urea in the urine thus containing leucin and tyrosin has already been referred to; and the mode of death usual under these circumstances, with coma or convulsions, or both, attending, can only be rationally explained on the supposition that there exists a condition analogous to uræmic poisoning, or identical with it.

In conclusion, I desire to express my obligations to my pupil, Mr. Merrill, who has greatly aided me in the German literature of this subject, and to my friend Dr. Nancrede, who kindly reproduced the drawings for me.

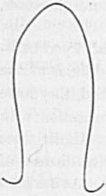
ART. VI.—*Cases of Cleft of the Hard and Soft Palate, Closed by Operation. Reproduction of Bone in the Palatine Vault.* By WM. R. WHITEHEAD, M.D., of New York, Physician for Diseases of Women at the Northwestern Dispensary; Fellow of the New York Academy of Medicine, etc. (With three wood-cuts.)

CASE I.—The subject of the following case was a little boy, not quite three years of age, who was sent to me by Prof. Charles A. Budd, of this city.

The cleft involved the whole of the hard and soft palate, and was one inch and a half in length, and five-eighths of an inch in its widest part, which part was in the palatine vault, at three-eighths of an inch from its anterior termination.

Operation July 5, 1871.—Present, Drs. F. A. Burrall, E. D. Hudson, Jr., A. Landeta, of Cuba, and Mr. O'Connor, medical student. The patient was etherized, and his mouth kept open with my gag. Just previous to the operation, the dimensions of the cleft were minutely measured with a pair of compasses, by my friend Dr. Burrall. His measurements confirmed my own previously made. The size of the cleft is shown at Fig. 1. The manner of doing the operation was such as I have already described (see *American Journal of the Medical Sciences*, July, 1871), and presented no difficulty worthy of note. Indeed, the case gave me less trouble than any upon which I have operated. The little patient reacted well, and the next morning I found him sitting in a rocking-chair. He was singing and rocking himself to and fro, and greeted me pleasantly. Each time it became necessary to examine his mouth, and wash out the side cuts, he struggled, and the gag was required. Five days after the operation, I was called away from the city, and was absent about ten days. Dr. Burrall kindly took charge of the case for me, and at the proper time removed some of the silver sutures. On July 22d I removed all of the remaining sutures, and found the side cuts nearly healed. The union of the parts was complete throughout, except a point the size of a pin's head at the extreme anterior part. It should be mentioned that these side cuts were intentionally kept from closing too soon, by stuffing fresh lint into them every day, until the line of union became quite firm. The denuded bone, as always occurs, was soon covered with a new periosteum, and with abundant granulations. The flaps of muco-periosteal tissue which were slid together at the middle line, were kept in this position with silver sutures, and by the pressure of the lint in the side cuts, until firm union took place. It was in these flaps, or the newly formed vault, that, on the the 16th of October, more than three months after the operation, I detected bone of recent formation. The presence of reproduced bone in this case, was discovered by means of a stout acupressure needle, pushed with considerable force against the new vault, and along the middle line. If the force which was ineffectually exerted to perforate this newly formed vault, as compared with that which was required to perforate the soft palate along the middle line, where it is quite thick, could be measured with a dynamometer, I should think that the two forces would be in the proportion of twenty to one. It has been alleged that the reproduction of bone in such cases is

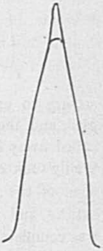
Fig. 1.



not permanent. Such is not absolutely correct.[1] I have, in two cases of patients in this city, allowed more than two years to elapse, and have found that no resorption of the bone has taken place. If, in the present case, the bone had not been permanently formed, there was sufficient time allowed for its resorption. This child is learning tc talk. Before the operation he pronounced his own name, which is Johnny, "Gonny." Now the child repeats his name Johnny distinctly, and the mother recently told me that there are some other words which it pronounces better now than before the operation.

CASE II.—Miss P., of Richmond, Virginia, a weak and delicate little girl, æt. 15, had a complete cleft of the hard and soft palate, and was sent to me at the suggestions of Prof. T. Gaillard Thomas, Prof. Wm. Darling, and of Mr. Wm. Branique, a well-known dentist of this city, and also of my friend Dr. F. D. Cunningham, of Richmond, Professor of Anatomy in the Richmond Medical College, who is her family physician. Mr. Branique furnished me with plaster impressions of the mouth taken before and after the operation. Fig. 2 shows the dimentions of the cleft measured from a plaster cast taken before the operation.

Fig. 2.



There were some peculiarities about this case, which made it one of the most tedious and difficult that I have operated upon. The cleft of the palate was originally complicated with a double harelip and an outward projection of the intermaxillary bone. During early infancy a portion of this bone was excised. The gradual approximation of the upper maxillæ caused the two canine teeth to be rather close together. Crowded upward and outward, and concealed high up under the lip, there were two rudimentary incisor teeth, which projected outward, and constantly irritated the lip. The loss of a portion of the intermaxillary bone, and the consequent narrowing of the upper jaw anteriorly, produced such a deformity of it as to make the gag fit badly. But this was not perceived before the operation, and not until during it, and after the gag had been worn about ten minutes. Then it was observed that the narrowness of the upper jaw made the tongue-depressor press the tongue obliquely downward, and crowd it against the epiglottis and threaten suffocation. But already I had cut all the palatine muscles before this difficulty occurred.

Operation August 7, 1871.—Present, Drs. J. C. Nott, Stephen Rogers, F. A. Burrall, J. Clark Thomas, A. Landeta, and Messrs. Wm. and J. W. Branique, dentists. The patient is at all times an exceedingly impressionable and nervous young lady, who has been much petted and indulged by her parents. She was etherized and gagged. The muscles were cut when symptoms of threatened suffocation, as already explained, came on, and the gag was removed. The tongue-depressor was filed off, the gag readjusted to the mouth, and the operation completed; but not until after much delay and perplexity in keeping the tongue out of my way. Mr. W. J. Branique rendered me most efficient aid, by kneeling before the patient and keeping the tongue depressed with his fingers during the passage of the sutures. The patient lost, after the operation, some blood, which oozed from one of the side cuts, and ran out of her nose. This bleeding was stopped two or three times, and recommenced again. It was stopped effectively after a few applications of ice-water spray, made very astringent with Squibb's liquor ferri persulphatis.

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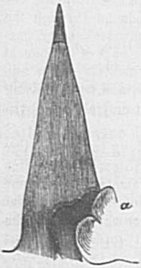
[1] See my Remarks on Reproduction of Bone in the *New York Medical Journal* of June, 1870.

On the third day after the operation I observed a very small slough near the mesial line, and below the middle of the soft palate. On the fifth day the soft palate partially opened at its lower part; the tonsil of the left side was greatly swollen, and was diseased. On the eleventh day I took out all the silver sutures which remained, some five or six in number.

About four weeks after the operation, Mr. Wm. Branique made a wax impression of the mouth, and from this impression a plaster cast. The black space in Fig. 3 exhibits the extent of the opening which remained in the soft palate at the time that the cast was made, and the letter *a* designates the prominence which still existed at that time, and which was caused by the enlarged tonsil. The whole of the hard palate is firmly united, as well as a part of the soft palate. In this case, with regard to the improvement in speech, it cannot be expected to obtain so satisfactory a result, as would be observed if the union were complete throughout the entire length of the palate. A secondary operation will be required to completely close the opening in the soft palate; but such an operation I would not attempt if the tonsil is at all diseased.

Fig. 3.



Dr. Cunningham, from whom I recently received a letter in reference to this case, has not yet had a suitable opportunity to make the needle test for the presence of bone in the new vault. He makes the following statement, in a letter dated October 16, 1871:—

"The palatine vault is now apparently complete, except a small orifice on the median line at the anterior extremity of the line of union, which, otherwise, seems to be perfect. She has evidently improved in speech; but not so much as would be the case if she were properly exercised."

In a subsequent letter, dated October 26, he writes as follows:—

"I introduced a needle at two points along the median line of the vault, and, although there was great resistance and toughness of the tissue, I did not recognize positively the presence of bone at the points that the needle penetrated. Owing to the extreme timidity of the little girl, I think it hardly possible to make a satisfactory examination without ether or chloroform; but I am satisfied that the *density* of the tissues over the previous gap is much increased since her return, and, as a consequence, the elasticity is diminished. The general condition of the mouth and pharynx is now good, and the general health of the patient improving."

He has kindly promised to make another examination in a few weeks, and keep me informed as to the development of bone in the new vault. I am sure that the excessive nervousness of the young lady quite prevented Dr. Cunningham from pushing the needle with sufficient force against the vault. As an illustration of the thoroughness with which I think the test for the presence of bone should be made, I will quote the following letter, which was published in a supplementary note to my Report on Cleft Palate in the *Transactions of the American Medical Association* of 1869:—

"NEW YORK, September 17, 1869.

"DR. W. R. WHITEHEAD—*Dear Sir:* In compliance with request is inclosed a statement of the results obtained from an examination of two cases which were submitted by you to the operation of periosteal uranoplasty. In the case of Miss S., æt. 15, there has evidently been deposit of bone in the periosteal surface of the flaps, which now form an admirable substitute for the natural hard palate. The point of a sound (Sim's), introduced through the nostril and pressed with some force against the floor of the nasal cavity, conveys no impression to the finger applied to the corresponding part of the buccal surface. A needle, introduced at various points along the cicatrix which indicates the line of union of the flaps, comes into contact with, and, by exercising considerable force, can be made to penetrate, what has certainly all the physical properties of bone.

"In the case of Maria D., æt. 7, the needle introduced along the mesial line gave the same results. The point of the needle appeared to pass about a line through a structure of the density of muco-fibrous membrane, and then come in contact with a more resisting body, which, by the exercise of force, the point of the needle could be made to penetrate so as to be immovably fixed. On withdrawal, it did not bring down with it the whole newly-formed vault, but only a portion immediately surrounding—say a radius of about two lines—and the impression conveyed to my mind was that the palate was formed by the reproduction of bone.

Respectfully yours,

"CHAS. K. BRIDDON, M.D."

These patients were examined, one immediately after the other. Plaster casts of the mouth of each, taken before the operation, were placed before Dr. Briddon while he was making his examinations.